CLAIMS

1   1.   A device for dithering a three-color source image, comprising:

2   a first logic for dissecting a color space of said source image into a plurality of

3   tetrahedrons each having four vertices;

4   a second logic for locating one of said tetrahedrons that contains a point corresponding to

5   a value of a pixel of said source image;

6   a third logic for generating a random number as a threshold value for dithering said pixel

7   of said source image;

8   a fourth logic for assigning a probability density corresponding to each of said vertex of

9   said located tetrahedron;

10   a fifth logic selecting a vertex as an interim output provided by said threshold value

11   through an inverse probability distribution function derived from said probability densities of

12   said vertices; and

13   a sixth logic for locating an output point in an output color space corresponding to said

14   selected vertex.

1   2.   A device for dithering a source image according to claim 1, wherein said first logic that

2   dissects said color space further comprises:

3   a first logic for truncating said value of said image pixel of said source image, for

4   locating a 3-dimensional cubic subinterval containing said point; and

5   a second logic for further dissecting said 3-dimensional cubic subinterval into a plurality

6   of tetrahedrons.

1   3.   A device for dithering a source image according to claim 1, wherein said logic for

2   generating a random number is a 2-dimensional array of psudo-random numbers overlaying on

3   top of said source image.

1   4.   A device for dithering a source image as recited in claim 1, further comprising a seventh

2   logic containing one-dimensional look-up tables for converting an 3-component input colorant

3   value into said pixel value.

1   5.   A device for dithering a source image as recited in claim 1, wherein the device is

2   embedded in a central processing unit in a computer system.

1   6.   A device for dithering a source image as recited in claim 1, wherein said device is

2   embedded in a processor in an output device.

1   7.   A device for dithering a source image as recited in claim 6, wherein said output device is

2   a printer.

1   8.   A device for dithering a source image as recited in claim 6, wherein said output device is

2   a display monitor.

1   9.   A method for dithering a three-color source image, comprising the steps of:

2   dissecting a color space of said color image into a plurality of tetrahedrons each having

3   four vertices;

4   locating one of said tetrahedrons that contains a point corresponding to a value of a pixel

5   of said source image;

6   generating a random number as a threshold value for dithering the said pixel value of said

7   source image;

8   assigning a probability density corresponding to each of said vertex of said located

9   tetrahedron;

10   selecting a vertex as an interim output provided by said threshold value through an

11   inverse probability distribution function derived from said probability densities of said vertices;

12   and

13   locating an output point in an output color space corresponding to said selected vertex.

1   10.   A method for dithering a source image according to claim 9, wherein said method that

2   dissects said color space comprises the further steps of:

3   truncating said value of said image pixel of said source image, for locating a 3-

4   dimensional cubic subinterval containing said point; and

5   further dissecting said 3-dimensional cubic subinterval into a plurality of tetrahedrons.

1   11.   A method for dithering a source image as recited in claim 9, further comprising the steps

2   of:

3   converting an input colorant value into said pixel value through one-dimensional lookup

4   tables, prior to said step of locating a tetrahedron.

1   12.   A method for dithering a source image according to claim 9, wherein the step of

2   generating a random number includes the step of fetching a psudo-random number from a 2-

3   dimensional threshold array overlaying on top of said source image.

1   13.   A device for dithering a source color image via weighting coefficients associated with a

2   plurality of sample points in a source color space of said source color image, comprising:

3   a first logic for generating said weighting coefficients of said sample points, wherein said

4   weighting coefficients are probability densities of said sample points;

5   a second logic for generating a random number as a threshold value for dithering a pixel

6   value of said source image;

7   a third logic selecting a point from said plurality of said sample points provided by said

8   threshold value through an inverse probability distribution function derived from said weighting

9   coefficients of said points; and

10   a fourth logic for locating an output point in an output color space corresponding to said

11   selected point.

1   14.   A device for dithering a source image according to claim 13, wherein said logic for

2   generating a random number is a 2-dimensional threshold array overlaying on top of said source

3   image.

1   15.   A device for dithering a source image as recited in claim 13, further comprising a fifth

2   logic containing look-up tables for converting an input colorant value into said pixel value.

1   16.   A device for dithering a source image as recited in claim 13, wherein the device is

2   embedded in a central processing unit in a computer system.

1   17.   A device for dithering a source image as recited in claim 13, wherein said device is

2   embedded in a processor in an output device.

1   18.   A device for dithering a source image as recited in claim 17, wherein said output device

2   is a printer.

1   19.   A device for dithering a source image as recited in claim 17, wherein said output device

2   is a display monitor.

1   20.   A method for dithering a source color image via weighting coefficients associated with a

2   plurality of sample points in a source color space of said source color image, comprising the

3   steps of:

4   generating said weighting coefficients of said sample points, wherein said weighting

5   coefficients are probability densities of said sample points;

6   generating a random number as a threshold value for dithering a pixel value of said

7   source image;

8   selecting a point from said plurality of said sample points provided by said threshold

9   value through an inverse probability distribution function derived from said weighting

10   coefficients of said points; and

11   locating an output point in an output color space corresponding to said selected point.

1   21.   A method for dithering a source image according to claim 20, wherein the step of

2   generating a random number includes the step of fetching a psudo-random number from a 2-

3   dimensional threshold array overlaying on top of said source image.

20